

## Summary of DOOS SIG Recommendations

1. Define **Deep Ocean EOVs**, create or improve specifications, and integrate these into GOOS EOV panel deliberations.
2. Identify and develop **expanded and enhanced deep-ocean observing capabilities** (e.g., through more efficient use of vessel servicing platforms and collaborations with industry). Mainstream deep-observing into the Decade for Ocean Science for Sustainable Development.
3. Develop an **advanced cyberinfrastructure for comprehensive data mining, integration, and FAIR** (findability, accessibility, interoperability, reusability) across the three main disciplines.
4. Identify **deep-ocean data gaps and needs** through gap analysis, communicate these to appropriate large program leads and the broader science community.
5. Initiate **a committee of large program deep observing leads** to communicate and coordinate observing activities among programs and to the broader scientific community.
6. Expand, update, and maintain **a deep-ocean observing inventory**, facilitating access to program metadata.
7. Develop **demonstration projects** that address questions of scientific and societal significance, integrate observing across disciplines, act to help mature observing technologies, and provide a template for future observing efforts.
8. Develop **communication tools** to inform the science community and convey deep-ocean observing needs and advances across disciplines, regions, sectors and jurisdictions.
9. Develop or improve **connections to stakeholders**, in particular in the economic and political sector to raise support for and sharpen requirements of DOOS.

## DOOS ACTIONS (from SIG APPENDIX)

### **Societal Motivation and Science Challenges Actions (Sections 1.C and 3):**

- Support DOOS SC and TT member attendance at related meetings and sessions conducted by physical oceanography , biogeochemistry , solid earth expert groups and teams also aligned with DOOS and GOOS principles.

### **Global Project Participation Action (Section 1.B):**

- Support ongoing participation of DOOS leadership in meetings of GOOS (specifically its panels and coordination activities related to large networks), POGO, BluePlanet, DOSI, INDEEP, the UN Decade for Ocean Science, and others.

### **EOV Actions (Sections 1.C and 3):**

- Coordinate and align Deep -EOVs with GOOS panel EOV designation (especially biology where the greatest discrepancy exists in EOVs).
- Support workshops exploring means to achieve the conceptual, technical, and data integration of EOVs across disciplines via demonstration projects, tackling emergent, inherently cross-disciplinary themes such as productivity, connectivity, and response to climate change.
- Compile a list of standard ocean variables (SOV), defined as measurements that are routinely collected in domain-specific, regional, or platform-dependent science operations that support the use and interpretation of EOVs.

### **Moving Forward Action (Section 9):**

- Hold a post OceanObs '19 Conference **open community workshop or scientific session** and reinforce or expand task teams to advance (a) deep-ocean relevant EOV development and dissemination (b) deep observing coordination – especially among the large programs (c) input to science planning and international policy (d) capacity building and training in deep-ocean observing.

#### **Platform and Sensor Actions (Section 4):**

- Conduct a study of the readiness levels of technologies (sensors and platforms) at various depths as related to DOOS EOVS measurements and associated challenges to data integration.
- Incorporate recommendations from OceanObs '19 to facilitate the integration of deep-sea platform needs of the physics, biogeochemistry and biology disciplines. From these develop a program that identifies EOVS integration approaches and the depth-specific readiness levels of technologies related to DOOS EOVS measurements and associated challenges to data integration.

#### **Data and Cyberinfrastructure Action (Section 6):**

- Support activities to define data curation, access, and user best practices and maturation or standardization requirements across deep-sea EOVS and associated data uptake and product development communities.

#### **Coordination Activities Action (Section 7):**

- Generate a systematic inventory of training courses, summer schools, workshops with a deep ocean theme or major deep component; include a review of academic institutions offering opportunities for students to join regular courses and MOOC. Seek capacity building support under INDEEP, DOSI, IODP, InterRidge, specific EU-funded programs.

# What is a DOOS Project ?

## (what does it mean to 'DOOSIFY'?)

- Integrating (or co-measuring) variables that are rarely measured together historically but whose joint observation can address new and important deep-sea science or societal questions.
- Integrating measurements from different observing 'platforms' or 'programs' in time and/or space to solve novel problems and assess new solutions or approaches.
- Enabling measurements (e.g. for immature EOVs) that are typically restricted to shallow water to be made in deep water.
- Reuse existing deep-ocean observing data collected for one purpose for a different purpose, possibly by a different discipline.
- Engaging novel platforms (e.g., from industry or another sector of science) and or new stakeholders in service of deep-ocean data collection.
- Consider the full pipeline from observations from collection to integrating across systems, analyzing and adding value, and eventual delivery stakeholders.
- Harmonize efforts between those making observations and those forming, using and revising quantitative models to look for areas where models might be readily improved by new observations, observations in new places, and assimilating data into hindcast, nowcast and forecast type model frameworks.
- Build on the needs of modelers, the policy community, educators, and other users into the design, collection, implementation and management of deep observing data up front (rather than after the fact), incorporating deep-sea requirements.